CNS 2016 ANNUAL MEETING San Diego CALIFORNIA SEPTEMBER 24-28, 2016

Aneurysmal Subarachnoid Hemorrhage Patients' Risk Assessment for Shunting (aSAH-PARAS): An International Collaborative Study and Initiation of a Consortium

Hadie Adams MD; Vin Shen Ban; Ville Leinonen; Salah G. Aoun MD; Jukka Huttunen; Taavi Saavalainen; Antti Lindgren; Juhana Frosen; Mikael Fraunberg MD, PhD; Timo Sakari Koivisto MD, PhD; Juha Antero Hernesniemi MD, PhD; Babu Guai Welch MD; Juha Jaaskelainen; Terhi J Huttunen

Introduction

Shunt dependent hydrocephalus(HCP) after aneurysmal subarachnoid hemorrhage(aSAH) is a common sequela which may lead to poor neurological outcome and predisposes to various interventions, (re)admissions and complications, including high rate of shunt failure and infections. We tested the feasibility of a new clinical risk score to identify subgroups of aSAH patients with increasing risk of shunting for HCP.

Methods

A total of 1,533 aSAH patients from the Eastern Finland Saccular Intracranial Aneurysm Database were used in a recursive partitioning analysis(RPA) to identify risk factors for shunt placement after aSAH. The risk model was built and internally validated in random split cohorts. External validation was conducted on 946 aSAH patients from the Southwestern Tertiary Aneurysm Registry and tested using Receiver Operating Characteristic (ROC) curves.

Results

The RPA defined 6 groups with successively increased risk: I(1%), II(8%), III(17%), IV(22%), V(42%), and VI(61%). These RPA groups(I-VI) also successively risk-stratified functional outcome at 12 months, shunt complications and time-to-shunt rates. The AUC-ROC for the exploratory sample and internal validation sample was 0.82 and 0.78, respectively, with an external validation of 0.68.

Conclusions

Prediction modeling shunt-dependency is feasible with clinically useful yields. External validation revealed a relatively good performance, considering the unadjusted differences between study cohorts. Current understanding of post-aSAH shunt-dependency is fragmented and standardizing the definitions and collection of data is needed. A universal risk and prediction model is only feasible through large-scale collaborative efforts involving well-characterized cohorts. The Aneurysmal Subarachnoid Hemorrhage PAtients' Risk Assessment for Shunting(aSAH-PARAS) Consortium has been initiated to pool the collective insights and resources to address key questions in post-aSAH shunt-dependency.

Learning Objectives

By the conclusion of this session, participant should: 1) identify subgroups of subarachnoid hemorrhage(aSAH) patients with increasing risk of shunt-dependent hydrocephalus(HCP), 2) understand the importance of development of a risk model with clinical useful yield 3) see the feasibly of risk score demonstrated with the RPA analysis.

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